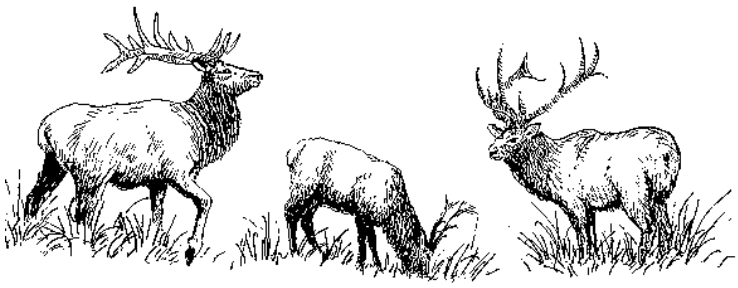

2001 HERD UNIT CLASSIFICATION OF ROOSEVELT ELK IN REDWOOD NATIONAL AND STATE PARKS (RNSP)

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INTRODUCTION

Historically, Roosevelt elk (*Cervus elaphus rooseveltii*) were endemic to the redwood forest ecosystem in northwestern California. Prior to settlement by early American citizens in the 1850's, Roosevelt elk were hunted by the Native Americans, with minimal impact to the elk population. In addition, the Chilula Indians burned the prairies of the Bald Hills regularly, probably in order to make food and plant material gathering easier for the tribe, and promote grass growth to attract wildlife (i.e., elk and deer). However, from 1848 to 1855 market hunting for elk hide and meat to supply gold miners during the northern California gold rush significantly reduced elk populations and distribution (USDI 1983). When the gold rush was over, settlement began and a great deal of elk habitat was burned or logged and converted for ranching cattle and sheep, and crop land use.

The only elk populations that persisted through this period were those occupying coastal lowlands in the northern part of coastal California, where dense forests and brush fields provided protective cover. Mandel and Kitchen (1979) estimated the elk population to be 1,000 to 1,300, with roughly half being located in and around Redwood National and State Park's (RNSP). RNSP's long-term goal for resource management is to restore and maintain the park's natural ecosystem as it would have evolved without human technology. This includes restoring elk herds to pre-settlement numbers and distribution and maintaining the population in equilibrium with the environment, regulated by habitat, predation, inter- and intra-specific competition and natural events.

Annual classification data of Roosevelt elk in Redwood National and State Parks has been undertaken since 1996 (Wallen 1997), in an attempt to document relative abundance and simple population characteristics, such as recruitment and calf survival within known herds. While long term monitoring such as this helps managers understand basic elk population dynamics within the park, it is not intended to replace more detailed investigations and research of the Roosevelt elk population within the park.

METHODS

During 2001, most of the elk classification counts during the spring and summer months (March-August) were conducted opportunistically by the Fish and Wildlife Branch staff while performing field surveys for other species. Field visits to herd areas from October through December were generally scheduled bi-weekly for classification counts, however some counts were made opportunistically while doing other field work. The elk classification counts were concentrated on 7 identified herd units (see below). Classification counts were performed by driving or hiking to the identified herd units, and also surveying historic and suspected areas were elk have congregated throughout the park. Using binoculars and spotting scopes, observers reported the total number of elk observed, and also the total number of elk within each classification group (see below). The observers also assigned an observation ranking criteria value to the classification count, identifying the observer's confidence in the count data (see below). Other RNSP staff and visitors also opportunistically reported elk counts at known herd units, and elk sightings in lesser or unknown elk use areas.

Herd Units

The herd units included in classification counts were as follows:

(1) **South Operations Center** (SOC) herd
(2) **Lower Redwood Creek** herd
(3) **Bald Hills** herd(s); (dispersed, several discrete herds)
(4) **Davison Ranch**/Berry Glen herd (considered the same herds)
(5) **Elk Prairie**/101 Bypass herd (considered the same herds)
(6) **Gold Bluffs Beach** herd(s); (dispersed, several discrete herds)
(7) **Crescent Beach Education Center** (CBEC) herd

Classification Groups

Elk herds are classed into groups by age and sex:

- **Cows** = all females >1 year old.
- **Calves** = young of the year (<1 year old; recognized early by spotted coat and small size; later the spots disappear, but they retain a short, rounded snout.)
- **Spikes** = year old males exhibiting only a main beam, brow tine absent.
- **Mature bulls** = ≥2 years, with brow tine evident off the main beam.

Observation Ranking Criteria

Rating criteria are used to evaluate the classification conditions and the observer's confidence in the count data:

1 = Good, visibility good and animals close enough to observe with high confidence accuracy.
2 = Fair, animals are either distant or not fully cooperative for good confidence in classification (e.g. observation time is reduced due to movement into cover).
3 = Poor, animals too far away (e.g. difficult to track individuals or animals are in adjacent hiding cover). Qualify the observation in the notes section.
4 = Unacceptable, bad visibility due to darkness, fog, uncooperative animals.

RESULTS

Classification counts were performed to determine the total number of elk within each herd unit, and also the total number of elk within each classification group (Table 1). That data was used to determine ratios of calves/cows (Table 2), and bull/cow ratios. The ratio of calves to cows is used an indication of herd productivity (e.g., more calves produced indicates a healthy herd).

Table 1. Highest number of elk reported within each herd unit and for each classification grouping (with average count ; standard deviation). MB= mature bull, SP= spike, CW= cow, CV= calf, n= total number of counts reported with ranking criteria <3.

Location	MB	SP	CW	CV	Total	n
SOC	**10**(7;1.9)	**2**(1;0.7)	**9**(3;4.2)	**0**(0;0)	**20**(11;5.8)	5
Redwood Creek	**4**(3;0.8)	**4**(2;1.9)	**31**(14;16)	**8**(3;3.9)	**44**(22;21.9)	4
Bald Hills	**1**(1;0.5)	**5**(1;1.8)	**54**(16;18)	**10**(3;4.1)	**67**(25;20.8)	8
Davison Ranch	**14**(6;4.9)	**2**(0;0.8)	**24**(7;9.8)	**7**(2;2.9)	**54**(23;18.7)	7
Elk Prairie	**2**(2;0.8)	**1**(0;0.5)	**19**(9;5.7)	**7**(3;2.5)	**22**(16;7.2)	7
Gold Bluffs Beach	**5**(2;1.9)	**2**(1;0.8)	**26**(13;11)	**5**(2;2.2)	**30**(17;13.1)	9
CBEC	**0**	**0**	**0**	**0**	**0**	3

Table 2. Calves per 100 cows for identified elk herds, 1996 to 2001.

Location	1996	1997	1998	1999	2000	2001
SOC	45	35	29	31	15	22
Redwood Creek	39	11	15	38	22	26
Bald Hills	25	20	32	32	21	19
Davison Ranch	23	27	18	23	41	29
Elk Prairie/Bypass	8	33	24	53	29	37
Gold Bluffs Beach	N/A	38	12	7	9	19
CBEC	N/A	N/A	N/A	N/A	13	N/A

South Operations Center (SOC) herd

Two calves were observed with the SOC herd in early June. However, the calves were not observed with the herd beyond August. Staff witnessed mountain lion predation of a deer near the SOC offices, and such predation possibly accounted for the early loss of the elk calves. The calf/cow ratio using the 2 observed calves and the highest cow count was 0.22. The bull/cow ratio was 1.1, which is considered very high, even for unhunted elk. The highest possible number of elk in this herd was 21.

Lower Redwood Creek herd

There were many reports of elk along the lower portion of Redwood Creek, downstream of the Tall Trees grove. While many of the reports were of a single elk, on average visitors reported seeing 30-40 elk along the creek corridor. The calf/cow ratio for this herd was 0.26 and the bull/cow ratio was 0.13. The highest possible number of elk in this herd was 47.

Bald Hills herd

The elk in the Bald Hills seem to be comprised of several discrete herds which have been observed near Ganns Prairie, Elk Camp, Airstrip, Childs, and Maneze Prairies, Coyote Creek, and the Williams Ridge area. There was one report of an elk herd of 130 during June of 2001. The second largest herd size was reported at 67 animals. With the exception of the herd of 130, the highest possible number of elk in this herd derived from classification counts was 70. The calf/cow ratio for this herd was 0.19 and the bull/cow ratio was 0.01. The extremely low number of bulls observed in the Bald Hills is likely due to habitat (e.g. plenty of second growth and old growth redwood and oak woodlands to hide in) and human presence (e.g. receives some poaching pressure and hunting in adjacent lands outside park), rather than a true lack of bulls.

Davison Ranch / Berry Glen herd

This elk herd is one of the most visible and easily accessible herds in the park. Therefore, classification counts were typically conducted under good visibility (e.g. the elk were in the open meadow) and the animals were often close enough to observe with a high confidence in accuracy. The herd typically consisted of a group of mature bulls that occupied the northern portion of the meadow, and a separate group of cows, spikes, and calves that occupied the southern portion of the meadow. However, biologists did document the Davison herd occupying the old growth redwood stands and riparian area south of the meadow on occasion. The highest possible number of elk in this herd was 54, and the calf/cow ratio was 0.29. The bull/cow ratio was 0.58, with 14 mature bulls observed during one of the counts.

Elk Prairie / 101 Bypass herd

Similar to Davison Ranch herd, the Elk Prairie herd is the other most visible and easily accessible herds in the park. The highest possible number of elk in this herd was 29. However, most sightings ranged from 15-20 animals total. These elk are often observed grazing along the shoulder of the highway 101 bypass when the are absent from the prairie, and some mortality due to vehicle collisions has occurred, both on the bypass and along Newton B. Drury parkway. The calf/cow ratio was 0.37, with seven calves observed in early July. The bull/cow ratio was 0.11 bulls, with only 2 bulls observed during counts.

Gold Bluff Beach herd

Similar to the bald Hills herd, The Gold Bluffs Beach herd seems to be comprised of several discrete herds which have been observed from Mussell Point to the Carruther's Cove area. However, the most consistent sightings of a large herd occurred near Ossogan Rocks. The highest possible number of elk in this herd was 38 with a calf/cow and a bull/cow ratio of 0.19. Small groups (<5) of elk or elk tracks were sometimes observed south of Major Creek during plover and carcass surveys. There have been reports of a small herd of elk that reside south of Mussel Point.

Crescent Beach Education Center herd

Fish and Wildlife staff only visited the CBEC area on 3 occasion the count elk. No elk were observed during these visits. However, some staff members stationed at

CBEC did record elk in the meadows near CBEC when they observed them. The highest reported number of elk in this herd was 6, all cows. During 2001, staff reported 14-16 cows, with 2 calves and 1-2 mature bulls frequenting the area. Less effort in the area may have contributed to a small count, or the group of elk present in 2001 may have dispersed to another area.

Other

Small groups of elk were reported in other areas of the park. For example, 3-4 bulls were observed at the far east end of the Aubell facility, and other individual sightings occurred. Elk have also been reported along coastal drive near Flint Ridge and as far south as the state prison grounds.

DISCUSSION

Harper et al (1985) reported that calf/cow ratios for Roosevelt elk in Oregon average 0.39 (range = 0.32 to 0.47). The Oregon estimates were from herd units that were subject to hunting mortality. In a late 1970's RNSP study, Mandel and Kitchen (1979) reported the approximate calf/cow ratio at 0.20. The calf /cow ratios reported for the identified elk herds within RNSP during 2001 ranged from 0.19 –0-.37, with all but 1 herd below 0.30. It is difficult to make meaningful comparisons of calf/cow ratios per herd from year to year due to the variability in sampling. The fact that observability of many herds is difficult and low numbers of sample counts indicate that current ratios may not accurately reflect real changes in calf production.

One of the greatest difficulties of obtaining accurate classification counts in RNSP is revealed in counts of Bald Hills and Gold Bluffs Beach herds. These areas are relatively large geographic units, and elk can be dispersed throughout these areas within sub-herds during the late summer and fall. The herds begin to group together in winter, when the calves have grown larger and are harder to differentiate from yearling cows. Combining the data from all observations in these areas does not provide a truly accurate cow/calf ratio, however it may be an accurate estimate of particular sub-herds when they are located.

The Gold Bluffs herds are relatively habituated, and observations can be made of individual groups; however, their dispersal throughout the beach corridor makes it difficult to ascertain discrete units. The Bald Hills herds undoubtedly receive some poaching pressure, making them difficult to observe for any length of time. The adjacent commercial timberlands are also open for hunting for 10 days in September, which appears to send park herds to remote prairies. The smaller herds at SOC, Davison, Elk Prairie/Bypass and lower Redwood Creek areas tend to group together in more discrete units, making cow/calf ratios easier to determine. These herds tend to be more habituated to humans, so observations are often more reliable.

Estimates of the total number of elk within RNSP range from 200-600. We documented a minimum of 325 elk within park boundaries during 2001. There were likely a substantial number of elk present within the park that we never observed. Because classification count surveys were not intended to account for all elk within the park, we can only provide a minimum count of elk inhabiting the park annually.

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